



Day 1 - Assembling the toolbox

The first day is essentially a lecture-based course, with each lecture lasting approximately 15-20 minutes, preceded and followed by question-and-answer periods.

A. Fundamentals

1. Butterflies and Legos : the foundations of molecular biology:
2. The size and numbers of the objects that molecular biologists study
3. Three archetypes of living organisms: bacteria, animals and plants, viruses
4. What life is like if you are a macromolecule
5. The three types of biological approaches: molecular biology, genetics, biochemistry
6. BREAKING NEWS of April 9, 1952: the genetic material is made of DNA !
7. BREAKING NEWS of April 25, 1953: DNA is a double helix!

B. DNA knowledge

8. DNA: the primary reservoir of information
9. The dawn of recombinant DNA technology: of microbes and men
10. BREAKING NEWS of November 1973: Genetic engineering is a reality !
11. Genomic DNA sequencing. A formidable technological challenge.

C. Gene expression

12. RNA: the message that comes with its toolbox
13. BREAKING NEWS of May 15, 1961: The genetic code is cracked!
14. Three gene archetypes: simple, complex, artificial



Day 2 - Using the toolbox

No matter what the exact task is, biologists always end up addressing on or more of the following general issues: diagnostics, isolation, characterization, manipulation... of a molecule, a cell, an organism or a population of organisms. The second day is a glimpse on how it is done with plants...

15. Review of Day 1
16. How different are plants from everybody else? A molecular view.

A. Finding it (diagnostics)

17. Measuring relatedness by DNA fragment polymorphisms
18. Measuring gene expression
19. Antibody-based diagnostics

B. Getting it (isolation and purification)

20. The sex story of a typical angiosperm: from seed to seed
21. Phenotypic breeding
22. Marker-assisted breeding
23. Genomics-assisted breeding
24. Proteomics-assisted breeding
25. Metabolomics-assisted breeding

C. Telling the world about it (characterization)

26. DNA Sequencing: then, now and later
27. Plant genomes: what data do they contain?
28. Transcriptomes, proteomes and epigenetics: the future?

D. Making it a superstar (manipulation)

29. Genetically modified plants: the debatable, the bad and the good
Three stories that illustrate how the toolbox can be used to create all kinds of plants and all kinds of issues and debates